

ABSTRACT OF THE DISCLOSURE

A VCSEL with current confinement achieved by an oxide insulating region and by an ion implant region. An annular shaped oxide layer is formed, and a gain guide ion implant is formed. The ion implant gain guide includes a central region having high conductivity. The VCSEL further includes first and second mirrors that are separated by an optical path of at least one wavelength. Furthermore, the oxide insulating region beneficially has a optical path of less than $\frac{1}{4}$ wavelength. The ion implanted spatial region is beneficially concentrically aligned with the oxide insulating region.

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